

Catalogue of American Amphibians and Reptiles.

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Chionactis.

Chionactis Cope
Shovel-Nosed Snakes

Lamprosoma Hallowell 1856:310. Type species, *Lamprosoma occipitale* Hallowell 1856, by monotypy (preoccupied by *Lamprosoma* Kirby 1818: Coleoptera).

Chionactis Cope 1860:241. Type species, *Chionactis occipitale* Cope 1860, by original designation and monotypy.

• **CONTENT.** Two species are recognized: *Chionactis occipitalis* and *C. palarostris*.

• **DEFINITION.** This genus of colubrid snakes is characterized by small size (250–425 mm TL) and a shovel-shaped snout with a deeply inset lower jaw. The rostral plate is pointed posteriorly, does not separate the internasals, and appears concave ventrally when viewed anteriorly. The head is only slightly distinct from the neck. Tail to total length ratios vary from 19–22% in males and 15–19% in females. The pupil of the eye is round. Scale characters on the head follow the usual colubrid pattern: supralabials usually 7, sometimes 6; infralabials usually 7, occasionally 6 or 8; temporals 1–2; usually a single loreal; single preocular, rarely divided; and postoculars 2, occasionally 3. Dorsal scale rows usually are 15–15–15. Ventral scales number 141–165 in males, 153–178 in females. Subcaudals are divided and number 39–57 in males, 34–51 in females. The dorsal scales are smooth and possess a single apical pit. The cloacal (anal) plate is divided.

The dorsal pattern consists of a series of black or brown crossbands on a white to yellow ground color. These bands number 10–41 on the body and 3–13 on the tail. The bands narrow laterally; some completely encircle the body, widening on the venter. Males possess approximately 10% fewer body bands than females. Orange or red saddles, occasionally with black or brown spotting, are sometimes present between the bands. A characteristic, variably crescent-shaped blotch on the head, especially in *C. occipitalis*, usually engages the parietals, the horns of which carry forward on the sides to the eyes or even the nostrils. The venter is sometimes spotted, in addition to being marked by bands that carry onto the under surface.

The maxillary teeth number is 8 + 3 or 9 + 3 (Stickel 1943). Three enlarged, laterally grooved maxillary teeth are located posteriorly, usually separated from the anterior teeth by a diastema. Stickel (1943) proposed the term “pleuroglyphous” to describe this dental type. Bogert and Oliver (1945) later commented on this type of dental arrangement and proposed the term “pseudo-opisthoglypha.” Klauber (1956, 1972) briefly described the pseudo-opisthoglyphous condition in the genera *Sonora*, *Chionactis*, *Chilomeniscus*, and *Pseudoficimia*. Bellairs (1969) and McKinstry (1983) included the genus *Chionactis* as a member of the opisthoglyphous colubrids.

The hemipenes are characterized by several rows of papillate calyces distally; proximally the hemipenis is spinose (Dowling 1975).

• **DIAGNOSIS.** *Chionactis* can be distinguished from all other North American colubrids by the following combination of characters: nasal valve well-developed, a flattened spade-like snout, a countersunk lower jaw, dark brown or black crossbands (usually 10 or more), dorsal scales usually in 15 rows, internasals

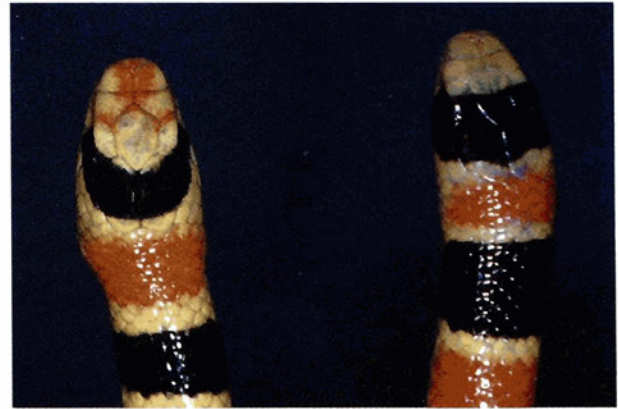


FIGURE 1. Dorsal view of the heads of two species of *Chionactis*: left, *C. occipitalis*, showing one of four conditions of the crescent-shaped blotch (see Cross 1979)(drawing of SDSNH 200, SVL 281 mm); right, *C. palarostris*, showing the rectangular blotch covering the parietal and frontal scales (drawing of SDSNH 45223, SVL 288 mm)(photograph by J. Evanson and P. Rosen).

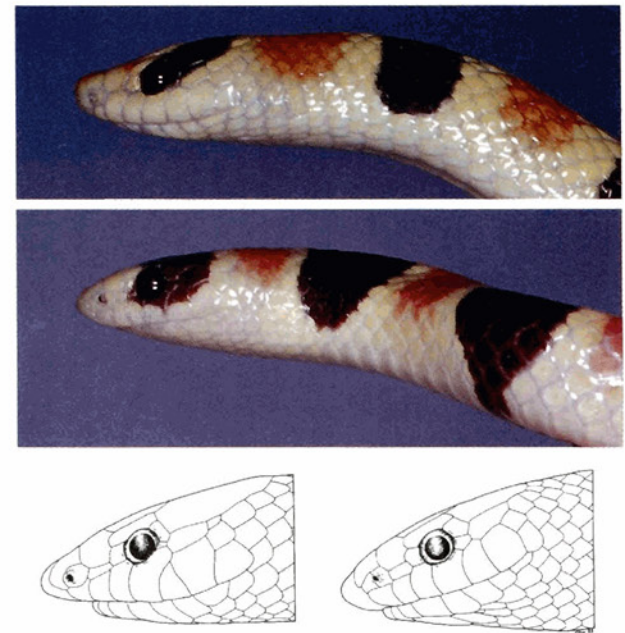


FIGURE 2. Lateral view of the head and profile of the snout of adult male *Chionactis occipitalis annulata* (top and lower left) and adult male *Chionactis palarostris organica* (middle and lower right)(photograph by J. Evanson and P. Rosen; drawing from Powell et al. 1998).

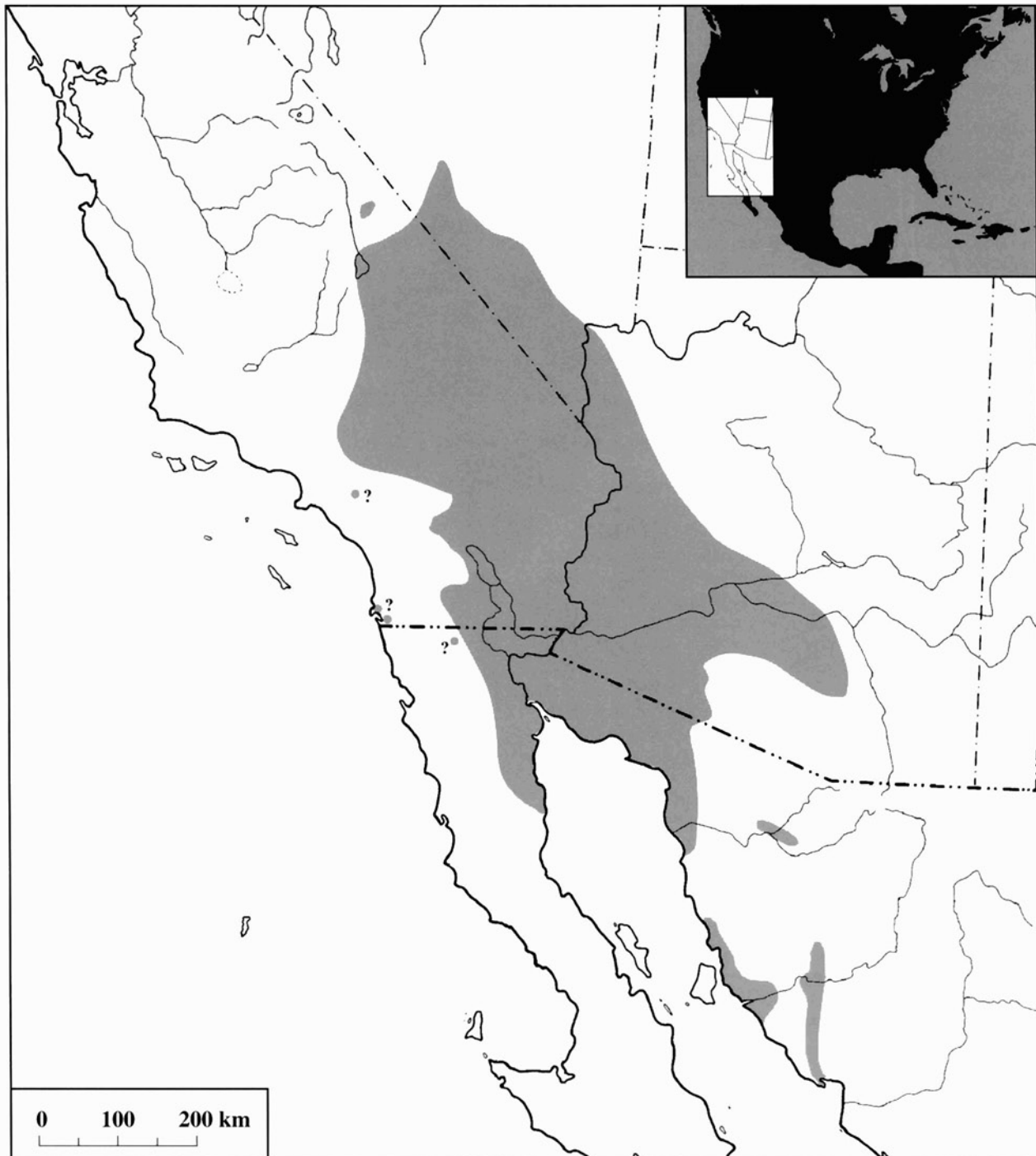
not separated by the rostral, and an angled abdomen with a flattened ventral surface.

• **DESCRIPTIONS.** The original description of the genus *Chionactis* was published by Cope (1860). Early descriptions appeared in Baird (1859a), Hallowell (1856, 1859), Cope (1861, 1892, 1900), Garman (1884), Boulenger (1894), Van Denburgh (1897, 1922), Brown (1901), Richardson (1910), Van Denburgh and Slevin (1913), Camp (1916), Klauber (1931, 1934), and Stickel (1943). Detailed descriptions of both species were presented by Klauber (1951) and Cross (1979).

General descriptions of *Chionactis occipitalis* and *C. palarostris* were published by Stebbins (1954, 1966, 1985),

Wright and Wright (1957), Fowle (1965), Cochran and Goin (1970), Brown (1974), Behler and King (1979), Smith and Brodie (1982), and Mattison (1989). Additional references providing descriptions of *C. occipitalis* and *C. palarostris* were published in Mahrtdt et al. (2001a,b).

• **ILLUSTRATIONS.** Line drawings of *Chionactis* were published by Baird (1859a,b), Hallowell (1859), Van Denburgh (1897), Cope (1900), Blanchard (1925), Schmidt and Davis (1941), Stebbins (1954, 1972), Cagle (1968), Casas Andreu and McCoy (1979), Cross (1979), Ballinger and Lynch (1988), Brown (1997), and Powell et al. (1998). Dowling and Duellman (1974–1978) published line drawings of a vertebra, maxilla, and



MAP. Distribution of the genus *Chionactis*.

hemipenis of *C. occipitalis*. **Color illustrations** appeared in Stebbins (1966, 1985), Brown (1974), Simon (1979), Behler and King (1979), and Smith and Brodie (1982). **Black and white photographs** of *Chionactis* are in Van Denburgh (1922), Perkins (1938, 1949), Ditmars (1939), Stickel (1941), Pickwell (1947), Cowles (1949), Klauber (1951), Hecht and Marien (1956), Wright and Wright (1957), Jaeger (1961), Parker (1963), Horstman (1964), Fowlie (1965), Blake (1970), Cochran and Goin (1970), Brame (1973), Breen (1974), Mitchell (1978), Frank (1979), Stoops and Wright (1993), Stewart (1994), and Flaxington (1998). Black and white photographs of tracks made by *Chionactis* in sand appeared in Mosauer (1935) and Cowles (1941, 1949, 1977). **Color photographs** of live specimens of *Chionactis* were published by Cochran and Goin (1970), Shaw and Campbell (1974), Heymann (1975), Switak (1978, 1984, 1986, 1993), Behler and King (1979), Grater (1981), Lowe et al. (1986), Alvarez Solórzano and Gonzalez (1987), Mehrtens (1987), Obst et al. (1988), Campbell and Lamar (1989), Mattison (1989), Coborn (1991), Macey and Papenfuss (1991), Schoenherr (1992), Stoops and Wright (1993), Arizona Game and Fish (1993), Scott (1996), Brown (1997), Hanson and Hanson (1997), Loza (1999), Bartlett and Tennant (2000), Holman (2000), McPeak (2000), and Grismer (2001). **Photographs of habitat** are in Klauber (1931), Mosauer (1933, 1935), Slevin (1951), Funk (1967), Switak (1978, 1984, 1986, 1993), and Mattison (1989).

• **DISTRIBUTION.** The genus *Chionactis* occurs in the southwestern United States in southern Nevada, southern California, and southwestern Arizona, and in México in northwestern Sonora and extreme northeastern Baja California. An isolated population is found in Inyo County, California. In western Sonora, large distributional gaps occur in some parts of the range; these are perhaps an artifact of inadequate sampling. *Chionactis* inhabits sandy dunes and desert washes and valleys of the Mojave and Sonoran deserts and sagebrush-creosote plant communities of the extreme southwestern Great Basin. The elevational range extends from below sea level to nearly 1500 m.

• **FOSSIL RECORD.** Van Devender and Mead (1978) and Van Devender et al. (1991b) reported fossil vertebrae of *C. occipitalis* and *C. palarostris* from the Early to Middle Holocene of California and Arizona. No extinct Pleistocene species of *Chionactis* have been described (Holman 1995).

• **PERTINENT LITERATURE.** Comprehensive taxonomic reviews of *Chionactis* were presented by Stickel (1938, 1941, 1943), Klauber (1951), Blake (1970), and Cross (1979). Phylogenetic relationships comparing *Chionactis* to other members of the tribe Sonorini were examined by Goyenechea (2000). Rabb and Marx (1973) discussed the ecological evolution of the genus. Dessauer (1967) included *Chionactis* in his summary of molecular methods used in resolving colubrid systematics.

Publications on aspects of the biology of *Chionactis* include **anatomy** (Underwood 1967, 1970; Baird 1970; La Duke 1991; Van Devender and Bradley 1994; Van Devender et al. 1991a), **behavior** (Gans 1974), **diet** (Kauffeld 1969), **mimicry** (Roze 1996), **physiology** (Lynn 1970, Maderson 1985), and **thermal requirements** (Mertens 1960, Porter 1972). Kerfoot (1970) examined the reduction and loss of **costocutaneous muscles** as they relate to the variation found in ventral scale counts of *Chionactis*. Characteristics of the **teeth** were discussed by Stebbins (1954) and Dowling (1975). Mosauer (1932, 1935), Klauber (1956, 1972), Schmidt and Inger (1957), Pough (1969), and Engelmann and Obst (1981) commented on the **morpho-**

logical and burrowing behavior adaptations of *Chionactis*. Comparative aspects of the **ecology** of both species were published by Rosen et al. (1996). Loza (1999) provided a brief account on **natural history** and discussed **captive husbandry**. Flores-Villela and Hernandez (1989) included *Chionactis* as one of three harmless genera occurring in Baja California that are similar in color pattern to the "coralillo," Spanish for Coral Snake; however, the Coral Snake (*Micruroides*) does not occur in Baja California (Grismer 1994). The genus *Chionactis* has been included in **generic checklists and keys** by Cope (1863, 1886), Van Denburgh (1895), Dunn and Dunn (1940), Romer (1956), McKinstry (1983), Williams and Wallach (1989), and Lowe (1994).

Additional publications containing checklists, species accounts, and topics discussing various aspects of the biology of *Chionactis occipitalis* and *C. palarostris* are in species accounts by Mahrtdt et al. (2001a,b).

• **ETYMOLOGY.** The generic name *Chionactis* is derived from the Greek *chion*, meaning "snow," and the Greek *aktis* or *aktinos*,

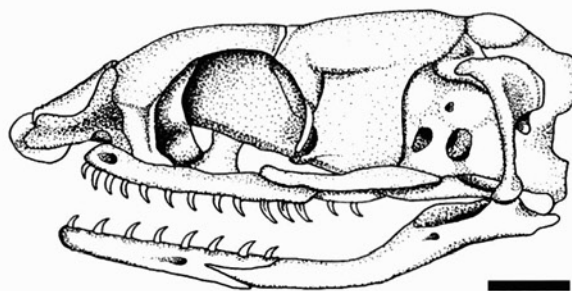


FIGURE 3. Skull of *Chionactis occipitalis* (SVL 241 mm), San Diego Natural History Museum (SDSNH) 64066, Imperial County, California. Bar equals 1 mm.

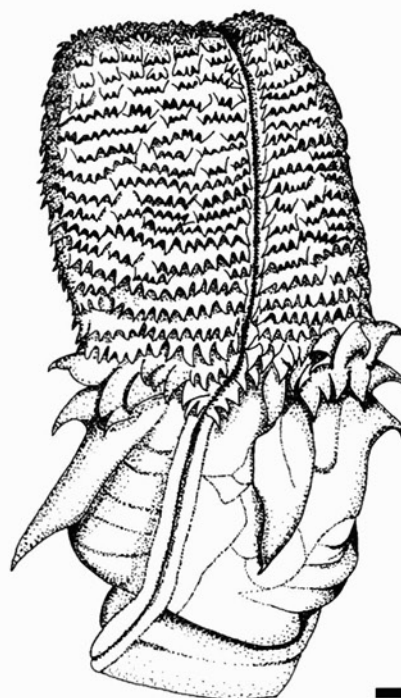


FIGURE 4. Sulcate view of the left hemipenis of *Chionactis occipitalis*, San Diego Natural History Museum (SDSNH) 23351, Imperial County, California. Bar equals 1 mm.

meaning a "ray or beam of light," in "allusion to the refulgent whiteness of the scale" (Cope 1860). The gender is feminine.

• **KEY TO THE SPECIES.** Parenthetical numbers refer to published species accounts.

- I. a. Snout flat above; usually 21 or more dark bands present on the body; a black mark usually in the form of a crescent present on top of the head *C. occipitalis* (730)
- b. Snout convex above; usually fewer than 21 dark bands present on the body; a black mark usually in the form of a broad band or rectangular spot present on top of the head ..
..... *C. palarostris* (731)

• **REMARKS.** Snakes now placed in *Chionactis* were first described as *Rhinostoma occipitale* by Hallowell (1854) from a single specimen collected in the "Mohave Desert." The genus *Rhinostoma* (type species, *R. nasua*) was established by Fitzinger (1826). Günther (1858) reported Hallowell's *R. occipitale* as occurring in West Africa, but this was criticized by Cope (1860) as being in error. Hallowell (1856), after reexamining the type specimen, concluded that *occipitale* was not a member of *Rhinostoma*, and established a new genus, *Lamprosoma*. Later, Hallowell (1859) repeated his description of the genus and type species and commented on the morphological characters distinguishing *Lamprosoma* from *Rhinostoma*. The genus *Lamprosoma* was used for the last time by Baird (1859a) for two specimens collected in the "Colorado Desert," which Baird diagnosed and described as *Lamprosoma annulatum*. Cope (1860), realizing the name *Lamprosoma* Hallowell 1856 was preoccupied, introduced the generic name *Chionactis*. Although Garman (1884) included *Chionactis* in the genus *Contia* (Baird and Girard 1853), that action was not widely accepted. Later, Van Denburgh and Slevin (1913) placed *Chionactis* in the genus *Sonora* Baird and Girard (1853), commenting that "Hallowell's *Lamprosoma* seems not to be generically distinct, although the species *occipitale* is so." This generic reallocation remained unchallenged for 30 years, when Stickel (1943), listing eight diagnosable morphological characters, revived *Chionactis*. Stickel (1943), commenting on the taxonomic position of *Sonora*, included *Chionactis* with several small, morphologically similar, sand-dwelling genera (i.e., *Chilomeniscus*, *Conopsis*, *Ficimia*, *Gyalopion*, *Procinura*, *Pseudoficimia*, *Sonora*, *Stenorrhina*, and *Toluca*) as members of the tribe Sonorini (see Dowling 1975). However, Goyenechea (2000), who recently examined the phylogenetic relationships among several genera of small North American snakes, did not support the existence of Sonorini as a monophyletic group.

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